Problem-solving Samples
These samples can be taken at any time during the growing season. Comparative samples from "good" and "bad" areas should be taken according to guidelines at the stage of growth.

Monitoring Samples
These samples should be taken at full tillering (Zadoks 30; Feekes 5) to predict nutritional status and additional nitrogen required to optimize yield. Final monitoring samples should be taken at flag leaf emergence (Zadoks 45; Feekes 10) to evaluate nutrient program.

- **Sufficiency Ranges**

Important Ratios
The N:S ratio should be between 10 and 15 for optimum yields. N:S ratios greater than or equal to 18 indicate that sulfur is limiting in relation to nitrogen.

Seedling to Tillering; Jointing to Flag Leaf Emergence

Macronutrients					
N	P	K	Ca	Mg	S
4.0–5.0%	0.2–0.5%	2.5–5.0%	0.2–1.0%	0.14–1.0%	0.15–0.65%

Micronutrients					
Fe	Mn	Zn	Cu	B	Mo
30–200 ppm	20–150 ppm	18–70 ppm	4.5–15 ppm	1.5–4 ppm	0.1–2.0 ppm

Flag Leaf Maturity

Macronutrients					
N	P	K	Ca	Mg	S
4.0–5.0%	0.2–0.5%	2.0–4.0%	0.2–1.0%	0.14–1.0%	0.15–0.65%

Micronutrients					
Fe	Mn	Zn	Cu	B	Mo
30–200 ppm	20–150 ppm	18–70 ppm	4.5–15 ppm	1.5–4.0 ppm	0.1–2.0 ppm

- **DRIS Norms**

DRIS norms for small grains have not been reported.